

# Pre-Calculus 11

*Foundational Outcomes*

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## Outcomes Framework Pre-Calculus 11 (2020-2021)

In September 2020, teachers will be working hard to create a space that is safe and welcoming for all learners no matter the location of their “classroom”. The first weeks will still be a time to establish a sense of community, engage learners in rich interactive experiences to promote critical thinking and create opportunities for collaboration and discussion. This is an opportune time to develop a culture and a climate for mathematics learning, conducive to collaboration, risk taking and inquiry.

The **Foundational Outcomes** identified in this document represent outcomes determined to be relevant for future learning in mathematics. Decisions about foundational outcomes were made in consultation with teachers, provincial mathematics team, Board and Regional Centre staff. The foundational outcomes are meant to guide teachers in making decisions about creating learning experiences that will prepare and engage their learners in a responsive way. However, a teacher’s professional judgment remains the most important guide to effectively responding to the needs of their learners.

Colour coding has been used to identify outcomes and indicators as foundational (**green**), optional (**orange**) or non-foundational (**red**) for the 2020-2021 school year.

<p><b>AN01</b> Demonstrate an understanding of the absolute value of real numbers.</p> <p><b>Performance Indicators:</b> all indicators</p>
<p><b>AN02</b> Solve problems that involve operations on radicals and radical expressions with numerical and variable radicands.</p> <p><b>Performance Indicators:</b> all indicators</p>
<p><b>AN03</b> Solve problems that involve radical equations (limited to square roots).</p> <p><b>Performance Indicators:</b> all indicators</p>
<p><b>AN04</b> Determine equivalent forms of rational expressions (limited to numerators and denominators that are monomials, binomials or trinomials).</p> <p><b>Performance Indicators:</b> all indicators</p>
<p><b>AN05</b> Perform operations on rational expressions (limited to numerators and denominators that are monomials, binomials or trinomials).</p> <p><b>Performance Indicators:</b> all indicators</p>
<p><b>AN06</b> Solve problems that involve rational equations (limited to numerators and denominators that are monomials, binomials or trinomials).</p>

**Performance Indicators:** all indicators

**T01** Demonstrate an understanding of angles in standard position [ $0^\circ$  to  $360^\circ$ ].

**Performance Indicators:** all indicators

**T02** Solve problems, using the three primary trigonometric ratios for angles from  $0^\circ$  to  $360^\circ$  in standard position.

**Performance Indicators:** all indicators

**T03** Demonstrate an understanding of angles in standard position, expressed in degrees and radians

**Performance Indicators:** all indicators

**T04** Develop and apply the equation of the unit circle.

**Performance Indicators:** all indicators

**RF01** Factor polynomial expressions of the form:

$$ax^2 + bx + c, a \neq 0$$

$$a^2b^2 - b^2y^2, a \neq 0, b \neq 0$$

$$a[f(x)]^2 + b[f(x)] + c, a \neq 0$$

$$a^2[f(x)]^2 - b^2[g(y)]^2, a \neq 0, b \neq 0$$

where  $a$ ,  $b$  and  $c$  are rational numbers.

**Performance Indicators:** all indicators

**RF02** Graph and analyze absolute value functions (limited to linear and quadratic functions) to solve problems.

**Performance Indicators:** all indicators

**RF03** Analyze quadratic functions of the form and determine the:

- vertex
- domain and range
- direction of opening
- axis of symmetry

- $x$ - and  $y$ -intercepts.

**Performance Indicators:** all indicators

**RF04** Analyze quadratic functions of the form to identify characteristics of the corresponding graph, including:

- vertex
  - domain and range
  - direction of opening
  - axis of symmetry
  - $x$ - and  $y$ -intercepts
- and to solve problems.

**Performance Indicators:** all indicators

**RF05** Solve problems that involve quadratic equations

**Performance Indicators:** all indicators

**RF06** Solve, algebraically and graphically, problems that involve systems of linear-quadratic and quadratic-quadratic equations in two variables

**Performance Indicators:**

- RF06.01 Model a situation, using a system of linear-quadratic or quadratic-quadratic equations.
- RF06.02 Relate a system of linear-quadratic or quadratic-quadratic equations to the context of a given problem.
- RF06.03 Determine and verify the solution of a system of linear-quadratic or quadratic-quadratic equations graphically, with technology.
- RF06.04 Determine and verify the solution of a system of linear-quadratic or quadratic-quadratic equations algebraically.
- RF06.05 Explain the meaning of the points of intersection of a system of linear-quadratic or quadratic-quadratic equations.
- RF06.06 Explain, using examples, why a system of linear-quadratic or quadratic-quadratic equations may have zero, one, two, or an infinite number of solutions.
- RF06.07 Solve a problem that involves a system of linear-quadratic or quadratic-quadratic equations, and explain the strategy used.

**RF07** Solve problems that involve linear and quadratic inequalities in two variables.

**Performance Indicators:** all indicators

**RF08** Solve problems that involve quadratic inequalities in one variable.

**Performance Indicators: all indicators**

**RF09** Analyze arithmetic sequences and series to solve problems.

**Performance Indicators: all indicators**

**RF10** Analyze geometric sequences and series to solve problems.

**Performance Indicators: all indicators**

**RF11** Graph and analyze reciprocal functions (limited to the reciprocal of linear and quadratic functions).

**Performance Indicators: all indicators**